IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant: Won-Joon Choi et al.

Assignee: Atheros Communications, Inc.

Title: Spur Mitigation Techniques

Serial No.: 10/664,792 File Date: September 16, 2003

Examiner: Jason M. Perilla Art Unit: 2611

Docket No.: ATH-0133

August 13, 2008

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

This Appeal Brief is in support of the Notice of Appeal dated May 2, 2008.

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee, Atheros Communications, Inc., pursuant to the Assignment recorded in the U.S. Patent and Trademark Office on January 27, 2004 on Reel 014939, Frame 0694.

II. RELATED APPEALS AND INTERFERENCES

Based on information and belief, there are no other appeals or interferences that could directly affect or be directly affected by or have a bearing on the decision by the Board of Patent Appeals in the pending appeal.

III. STATUS OF CLAIMS

Claims 7-24 are cancelled. Claims 1-6 are pending. Claims 1-6 stand rejected.

In the present paper, rejected Claims 1-6 are appealed.

Pending Claims 1-6 are listed in the Claims Appendix.

IV. STATUS OF AMENDMENTS

All claim amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A concise explanation of the subject matter defined in each of the independent claims involved in the appeal (i.e. **Claims 1 and 6**) is provided below. This concise explanation provides exemplary, non-limiting references to the specification by paragraph, page, and line numbers, and to the drawings, if any, by reference numbers/characters.

Claim 1. A method of improving receiver performance by avoiding bad pilots, the method comprising:

generating a pilot mask for immediate data communication use in the receiver based solely on analysis at the receiver **[Figure 5: 500; Specification, page 11, line 28 to page 12, line 13 (paragraph 0045)]**,

wherein the pilot mask includes a set of flags, the set of flags associated with certain sub-channels **[Figure 5: 500; Specification, page 11, line 28 to page 12, line 13 (paragraph 0045)]**,

wherein each flag in the set of flags determines whether its associated sub-channel is usable for pilot tracking, wherein at least one flag indicates its associated sub-channel is not usable for pilot tracking, thereby allowing the receiver to avoid a bad pilot **[Figure 5: 500; Specification, page 11, line 28 to page 12, line 13 (paragraph 0045)]**.

Claim 6. A pilot mask for improving receiver performance by avoiding bad pilots, the pilot mask comprising:

a set of flags generated in the receiver for immediate data communication use based solely on analysis at the receiver, the set of flags associated with certain sub-channels, wherein each flag in the set of flags determines whether its associated sub-

channel is usable for pilot tracking **[Figure 5: 500; Specification, page 11, line 28 to page 12, line 13 (paragraph 0045)]**.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following issues are presented to the Board of Appeals for decision:

(A) Whether Claims 1-3, 5, and 6 are patentable under 35 U.S.C. 103(a) over U.S. Publication 2003/0231582 (Logvinov) in view of U.S. Patent 6,934,340 (Dollard).

(B) Whether Claim 4 is patentable under 35 U.S.C. 103(a) over Logvinov, Dollard, and U.S. Publication 2004/0081076 (Goldstein).

VII. ARGUMENTS

A. Claims 1-3, 5, and 6 are patentable under 35 U.S.C. 103(a) over U.S. Publication 2003/0231582 (Logvinov) in view of U.S. Patent 6,934,340 (Dollard)

1. Logvinov: Overview

Logvinov teaches techniques for selecting the best carriers for pilot tone insertion as well as the detection and avoidance of already occupied frequencies. Paragraph 0016. Logvinov teaches gathering channel (signal and noise) data during periods when transmitters occupy the channel as well as times when the channel is idle. Paragraph 0016 and Claim 1. Logvinov can use channel data from the transmitter it is communicating with as well as all transmitters. Paragraph 0039. In one embodiment, Logvinov can provide an estimate of channel quality without the need to directly contact any other transmitters, e.g. using

"heart beat" messages. Paragraphs 0038 and 0039. Logvinov teaches selecting a minimum number of pilot tones required in such a way that most of the tones are received by all nodes of a system. Paragraph 0042. After such determination, the system may reallocate pilot tones. Paragraph 0042. Logvinov teaches that the same approach is applicable for determining the presence of interferers. Paragraph 0043.

2. Dollard: Overview

Dollard teaches that a first communication device samples an RF channel and performs a spectral analysis. Col. 5, lines 40-43. The results of that analysis can be transmitted to a second communication device using a data packet including a bitmap indicative of which sub-carriers are usable/unusable by the first communication device. Col. 5, lines 45-52. The second communication device responds by sampling the RF channel and determining which sub-carriers are suitable for communicating with the second communication device. Col. 5, line 64 to col. 6, line 1. The second communication device communicates with the first communication device to transmit that sub-carrier information. Col. 6, lines 2-17.

3. Limitations recited in Claims 1-3, 5, and 6 are not taught by Logvinov and Dollard.

Claim 1 recites in part, "generating a pilot mask for immediate data communication use in the receiver based solely on analysis at the receiver". Appellant respectfully submits that neither Logvinov nor Dollard teach this limitation.

Logvinov teaches that the receiver gathers channel data during periods when transmitters occupy the channel as well as times when the channel is idle. Paragraph 0016. Channel data from the transmitter the receiver is communicating with, as well

as all other transmitters, can be used to improve an error rate of the receiver. Paragraph 0039. Loginov trys to minimize the number of pilot tones, wherein the pilot tones are used for synchronization. Paragraph 0042. To this end, Loginov analyzes the channel and selects the minimum number of pilot tones required (such that most of the tones are received by all nodes of the system). Paragraph 0042. Loginov teaches that the system may reallocate pilot tones after this analysis is done. Paragraph 0042. This same approach is applicable for determining the presence of narrow and wide band interferers. Paragraph 0043. Logvinov uses the gathered data to improve receiver effectiveness and avoid interference. Paragraphs 0016 and 0043.

The Examiner states that Logvinov fails to teach various limitations recited in Claim 1 (including the above-quoted limitation). The Examiner then cites Dollard as teaching this limitation of Claim 1. Appellant respectfully traverses this characterization based on the below remarks.

Dollard generates a bitmap that is indicative of usable and unusable sub-carriers based on analysis at a first communication device C1 and then sends that initial bitmap to a second communication device C2. Col. 7, lines 30-38. This bitmap is transmitted to C2 using a plurality of sub-carriers, including those not suitable for reception by the first communication device C1 as they may be suitable for reception by the second communication device C2. Col. 7, lines 39-44. The second communication device C2 then determines which sub-carriers are unsuitable for C2 and modifies the bitmap to reflect any such unsuitable sub-carriers. Col. 8, lines 13-20. If the bitmap is not modified, then the second communication device can merely send the first communication device back an ACK signal. Col. 8, lines 20-22. If the bitmap is modified, then this bitmap is

sent back to the first communication device to establish the sub-carriers to be used for data transfers between the devices. Col. 8, lines 23-28 (e.g. see Fig. 3 that indicates "Commence Data Communication" after step 74). Thus, Dollard teaches a bitmap that requires analysis and input from two communication devices before data communication can begin.

In contrast, in the recited method, the pilot mask used for data communication can be generated based only on analysis at the receiver. Notably, once generated, this pilot mask can immediately be used for data communication without input from another communication device. Therefore, this method is more efficient than either Logvinov or Dollard, both of which teach techniques that use analysis from a transmitter and a receiver.

Because Logvinov and Dollard fail to disclose or suggest the recited step of generating or appreciate its advantages, Appellant requests reconsideration and withdrawal of the rejection of Claim 1.

Claims 2-3 and 5 depend from Claim 1 and therefore are patentable for at least the reasons presented for Claim 1. Based on those reasons, Appellant requests reconsideration and withdrawal of the rejection of Claims 2-3 and 5.

Claim 6, as amended, now recites, "a set of flags generated in the receiver for immediate data communication use based solely on analysis at the receiver". Therefore, Claim 6 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Appellant requests reconsideration and withdrawal of the rejection of Claim 6.

B. Claim 4 is patentable under 35 U.S.C. 103(a) over Logvinov, Dollard, and U.S. Publication 2004/0081076 (Goldstein).

1. Logvinov & Dollard: Overviews (see Section A)

2. Goldstein: Overview

In a first embodiment called a "closed loop power control" (CLPC) scheme, Goldstein teaches that a hub is provided with certain intelligence, which allows it to provide optimal distribution of carriers among nodes (i.e. maximum frequency diversity of carriers bearing the same information symbol). Paragraph 0019. In the CLPC scheme, the hub provides a preliminary assignment of carriers for all nodes participating in a given session. Paragraph 0019. All active nodes then transmit on the assigned carriers with a maximum possible power level or with a given initial power level. Paragraph 0019. The hub receiver measures and estimates the signal powers of all of the received individual carriers. Paragraph 0019. If the difference between powers of the individual carriers does not exceed a given threshold, then the hub allows the nodes to transmit data on the preliminary assigned carriers with no power changes. Paragraph 0019. If, however, the difference between powers of the individual carriers exceeds the given threshold, the hub provides a two-step power correction. Paragraph 0019.

In a second embodiment of called an open loop power control (OLPC) scheme, a node is provided with sufficient intelligence to make independent decision about carrier duplications and send the corresponding request regarding carrier assignment to the hub. Paragraph 0020. More particularly, in the OLPC scheme, the hub provides a preliminary assignment of carriers for all the nodes participating in a given session. Paragraph 0020. The node receiver measures and estimates the average power Pa of the assigned carriers transmitted by the hub and calculates a difference Dp between the estimated power and some predetermined nominal level Pn (i.e. Dp=Pa-Pn). Paragraph 0020. If the calculated difference Dp is within a given threshold Th, (e.g.

if -3 dB<Dp<3 dB), then the node transmits data on the preliminary assigned carriers without any power changes. Paragraph 0020. On the other hand, Dp>Th (e.g. Dp>3 dB), then the node decreases the power of the preliminary assigned carriers to provide a difference between the corrected power and the predetermined nominal level within the given threshold and transmits data on the preliminary assigned carriers with the corresponding power changes. Paragraph 0020. If Dp<-Th (e.g. if Dp<-3 dB), then the node determines the number of duplications (i.e. the number of carriers) required for the corresponding power gain, and transmits to the hub a request for additional carriers (or uses predetermined reserved carriers), and then transmits data on assigned duplicated carriers. Paragraph 0020.

3. Limitations recited in Claim 4 are not taught by Logvinov, Dollard, and Goldstein.

Claim 4 depends from Claim 1 and therefore is patentable for at least the reasons presented for Claim 1. Goldstein fails to remedy the deficiencies of Logvinov and Dollard with respect to Claim 1. Specifically, Goldstein also fails to disclose or suggest "generating a pilot mask for immediate data communication use in the receiver based solely on analysis at the receiver". Because none of the cited references disclose or suggest this limitation, Appellant requests reconsideration and withdrawal of the rejection of Claim 4.

C. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejections of Claims 1-6 are erroneous, and reversal of these rejections is respectfully requested.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (Previously Presented) A method of improving receiver performance by avoiding bad pilots, the method comprising:

generating a pilot mask for immediate data communication use in the receiver based solely on analysis at the receiver,

wherein the pilot mask includes a set of flags, the set of flags associated with certain sub-channels,

wherein each flag in the set of flags determines whether its associated sub-channel is usable for pilot tracking, wherein at least one flag indicates its associated sub-channel is not usable for pilot tracking, thereby allowing the receiver to avoid a bad pilot.

2. (Original) The method of Claim 1, wherein if a spur will coincide with a sub-channel, then the pilot mask will not allow that sub-channel to be used for pilot tracking.

3. (Original) The method of Claim 1, wherein if a spur affects a sub-channel, then the pilot mask will not allow that sub-channel to be used for pilot tracking.

4. (Original) The method of Claim 1, wherein the set of flags includes 52 flags associated with 52 sub-channels.

5. (Original) The method of Claim 1, wherein the pilot mask is usable for any data rate.

6. (Previously Presented) A pilot mask for improving receiver performance by avoiding bad pilots, the pilot mask comprising:

a set of flags generated in the receiver for immediate data

communication use based solely on analysis at the receiver, the set of flags associated with certain sub-channels, wherein each flag in the set of flags determines whether its associated sub-channel is usable for pilot tracking.

7-24. (Cancelled)

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.